

1 **What is claimed is:**

2 1. A method of digitally canceling interference on a received signal
3 within a satellite payload comprising adaptively canceling interference on the
4 received signal using an interference reference feedforward signal.

1 2. A method as in claim 1 further comprising subtracting an counter-
2 interference signal from the received signal to form a desired signal.

1 3. A method as in claim 2 further comprising digitally processing said
2 desired signal to generate said feedforward interference reference signal.

1 4. A method as in claim 3 further comprising correlating said
2 interference reference feedforward signal to said desired signal to generate an error
3 signal.

1 5. A method as in claim 4 wherein adaptively canceling interference on
2 the received signal further comprising generating said counter-interference signal
3 based on said error signal to cancel said interference.

1 6. A method as in claim 5 wherein adaptively canceling interference
2 further comprises iteratively canceling interference on the received signal until said
3 error signal equals zero.

1 7. A method as in claim 1 wherein said adaptively canceling
2 interference further comprises digitally and accurately replicating the interference.

1 8. A method as in claim 1 further comprising simultaneously digitally
2 canceling interference on a plurality of received signals.

1 9. A method as in claim 1 further comprising sequentially digitally
2 canceling interference on a plurality of received signals.

1 10. A method of digitally canceling interference on a received signal
2 within a satellite payload comprising:

3 receiving a communication signal having interference;

4 converting said communication signal into the received signal;

5 subtracting a counter-interference signal from the received signal to form a
6 desired signal;

7 digitally processing said desired signal to form an interference reference
8 feedforward signal;

9 correlating said interference reference feedforward signal to said desired
10 signal to generate an error signal; and

11 adaptively canceling interference on the received signal based on said error
12 signal by generating said counter-interference signal to cancel said interference.

1 11. A satellite communication system comprising:

2 a first antenna for receiving a communication signal;

3 an analog-to-digital converter (ADC) electrically coupled to said first
4 antenna, said ADC converting said communication signal to a received signal;

5 a satellite payload circuit comprising a first input, a second input, and an
6 output, said first input is electrically coupled to said ADC;
7 said satellite payload circuit digitally processing said received signal to
8 form an interference reference feedforward signal; and
9 a feedforward signal path electrically coupling said output to said second
10 input, said feedforward signal path transferring said interference reference
11 feedforward signal from said output to said second input.

1 12. A system as in claim 11 wherein said satellite payload circuit further
2 comprises:

3 a subtractor electrically coupled to said ADC, said subtractor subtracting a
4 counter-interference signal from said received signal to form a desired signal;

5 a digital processor electrically coupled to said subtractor, said digital
6 processor generating said interference reference feedforward signal from said
7 desired signal;

8 a correlator electrically coupled to said subtractor, said correlator comparing
9 said interference reference feedforward signal to said desired signal to generate an
10 error signal; and

11 a controller electrically coupled to said correlator and said subtractor, said
12 controller adaptively canceling interference on said received signal based on said
13 error signal.

1 13. A communication system comprising:
2 a first antenna for receiving a communication signal;
3 an analog-to-digital converter (ADC) electrically coupled to said first
4 antenna, said ADC converting said communication signal to a received signal;
5 a subtractor electrically coupled to said ADC, said subtractor subtracting a
6 counter-interference signal from said received signal to form a desired signal;
7 a digital processor electrically coupled to said subtractor, said digital
8 processor generating said interference reference feedforward signal from said
9 desired signal;
10 a correlator electrically coupled to said subtractor, said correlator comparing
11 said interference reference feedforward signal to said desired signal to generate an
12 error signal; and
13 a controller electrically coupled to said correlator and said subtractor, said
14 controller adaptively canceling interference on said received signal based on said
15 error signal.